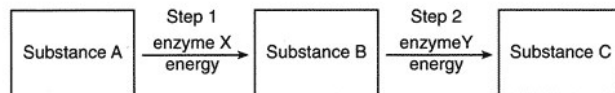


Name: _____

Date: _____

1

The diagram below represents the chemical pathway of a process in a human liver cell.

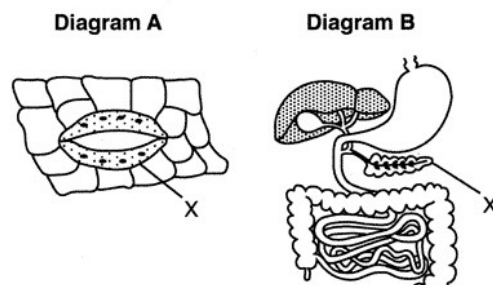


A particular liver cell is unable to make substance C. One possible explanation for the inability of this cell to make substance C is that

- (1) excess energy for step 2 prevented the conversion of substance B to substance C
- (2) an excess of enzyme X was present, resulting in a decrease in the production of substance B
- (3) nuclear DNA was altered resulting in the cell being unable to make enzyme Y
- (4) a mutation occurred causing a change in the ability of the cell to use substance C

2

Diagram A below represents a microscopic view of the lower surface of a leaf.
Diagram B represents a portion of the human body.



a Choose *one* diagram and record its letter, A or B, in the space provided.

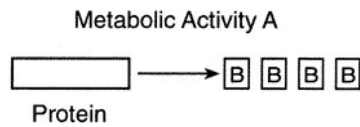
Diagram: _____

b Identify the structure labeled X in the diagram you chose. [1]

c State *one* problem for the organism that would result from a malfunction of the structure you identified. [1]

3

The diagram below represents one metabolic activity of a human.



Letters *A* and *B* are best represented by which row in the chart?

Row	Metabolic Activity A	B
(1)	respiration	oxygen molecules
(2)	reproduction	hormone molecules
(3)	excretion	simple sugar molecules
(4)	digestion	amino acid molecules

4

When a person does strenuous exercise, small blood vessels (capillaries) near the surface of the skin increase in diameter. This change allows the body to be cooled. These statements best illustrate

- | | |
|-----------------|----------------|
| (1) synthesis | (3) excretion |
| (2) homeostasis | (4) locomotion |

5

Scientific studies show that identical twins who were separated at birth and raised in different homes may vary in height, weight, and intelligence. The most probable explanation for these differences is that

- (1) original genes of each twin increased in number as they developed
- (2) one twin received genes only from the mother while the other twin received genes only from the father
- (3) environments in which they were raised were different enough to affect the expression of their genes
- (4) environments in which they were raised were different enough to change the genetic makeup of both individuals

6

When DNA separates into two strands, the DNA would most likely be directly involved in

- | | |
|-------------------|---------------------|
| (1) replication | (3) differentiation |
| (2) fertilization | (4) evolution |

7

The instructions for the traits of an organism are coded in the arrangement of

- (1) glucose units in carbohydrate molecules
- (2) bases in DNA in the nucleus
- (3) fat molecules in the cell membrane
- (4) energy-rich bonds in starch molecules

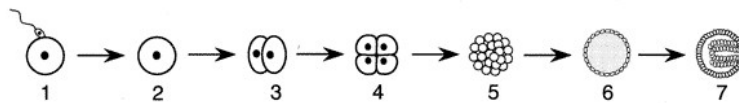
8

Which statement is true regarding an alteration or change in DNA?

- (1) It is always known as a mutation.
- (2) It is always advantageous to an individual.
- (3) It is always passed on to offspring.
- (4) It is always detected by the process of chromatography.

9

The sequence of diagrams below represents some events in a reproductive process.



To regulate similar events in human reproduction, what adaptations are required?

- (1) the presence of genes and chemicals in each cell in stages 1 to 7
- (2) an increase in the number of genes in each cell in stages 3 to 5
- (3) the removal of all enzymes from the cells in stage 7
- (4) the elimination of mutations from cells after stage 5

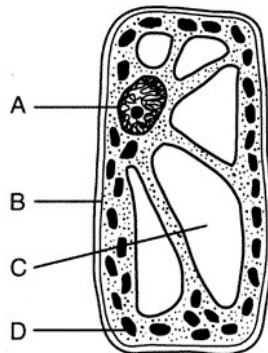
10

In animals, the normal development of an embryo is dependent on

- (1) fertilization of a mature egg by many sperm cells
- (2) production of new cells having twice the number of chromosomes as the zygote
- (3) production of body cells having half the number of chromosomes as the zygote
- (4) mitosis and the differentiation of cells after fertilization has occurred

11

Which letter indicates a cell structure that directly controls the movement of molecules into and out of the cell?



- | | |
|-------|-------|
| (1) A | (3) C |
| (2) B | (4) D |

12

Which process normally occurs at the placenta?

- (1) Oxygen diffuses from fetal blood to maternal blood.
- (2) Materials are exchanged between fetal and maternal blood.
- (3) Maternal blood is converted into fetal blood.
- (4) Digestive enzymes pass from maternal blood to fetal blood.

13

Individual cells can be isolated from a mature plant and grown with special mixtures of growth hormones to produce a number of genetically identical plants. This process is known as

- (1) cloning
- (2) meiotic division
- (3) recombinant DNA technology
- (4) selective breeding

14

The most immediate response to a high level of blood sugar in a human is an increase in the

- (1) muscle activity in the arms
- (2) blood flow to the digestive tract
- (3) activity of all cell organelles
- (4) release of insulin

Which sequence represents the correct order of levels of organization found in a complex organism?

- (1) cells → organelles → organs →
organ systems → tissues
- (2) tissues → organs → organ systems →
organelles → cells
- (3) organelles → cells → tissues →
organs → organ systems
- (4) organs → organ systems → cells →
tissues → organelles